+ 1.06, corresponding to G4. It will be possible to check the relation between color index and spectral type in this instance by a direct classification of both spectra.

A preliminary solution for some of the orbital elements of the system permits a rough determination of the density of the two stars. It is found that for the faint component the density in terms of the Sun will not exceed a few hundredths and may be much less; for the brighter component the density will probably not be less than four tenths that of the Sun, a value in good agreement with the known density of several F-type eclipsing stars.

The change in color at a total eclipse has been determined definitely heretofore in the case of only one star, namely for RR *Draconis,* by SEARES, using the 60-inch reflector. In that case a similar result was obtained; the photographic range was found to be $3^m.82$, while the photovisual range was $0^m.57$ less. In the system of RR *Draconis,* as in TW *Andromedæ,* the fainter, redder companion is probably much less dense than its bluer primary. It has in both systems many times the volume of the brighter component and probably has smaller mass. We may expect, then, that the atmospheric conditions are not the same and that, as a consequence, the difference in color indices between the two components may possibly be due in part to peculiar atmospheric absorption rather than to conspicuous difference in spectral type.

HARLOW SHAPLEY.

MOUNT WILSON SOLAR OBSERVATORY,
November 7, 1914.

THREE STARS WITH BRIGHT HYDROGEN LINES.

The following stars have one or more bright hydrogen lines in their spectra:—

Boss 1215	6.0	B6	$5^h\ 2^m.5$	+21° 35′	Hβ and Hγ
BD − 8° 4352	8.8	Ma	16 50 .7	− 8 10	Hβ, Hγ, etc.
BD +13° 4692	6.6	B6	21 19 .5	+13 40	Hβ

The most interesting of these stars is the second. It has a proper motion of 1″.29 annually, and a measured parallax of 0″.210. Its absolute magnitude, therefore, (*Sun* = 5.5) is

10.4. This star furnishes a proof of the possibility of the existence of bright lines in the spectra of stars of very low intrinsic brightness. W. S. ADAMS.

TEN SPECTROSCOPIC BINARIES.

The following stars have been found to be spectroscopic binaries:—

	Mag.	Spec.	R.A. 1910	Dec.	Range in Velocity km		
Boss 9	6.3	G5	$0^h\ 3^m.8$	$-2°\ 55'$	−15	to	+16
Boss 1177	5.6	A0	4 52 .6	+24 55	+ 1		+49
Boss 2381	5.5	A2	8 47 .2	− 6 50	+10		+56
Boss 2484	5.8	A2	9 11 .5	+47 12	−14		+76
Lal. 18397	7.7	G7p	9 16 .8	+40 38	−16		−54
Boss 3323	5.0	A5p	12 41 .2	+ 8 9	−43		+36
Boss 3428	7.1	B9p	13 8 .6	−18 21	−100		+17
Boss 3540	6.3	A0p	13 39 .2	− 5 3	−63		+41
Boss 4660	5.7	F7	18 21 .6	+ 7 59	−46		− 4
Boss 5070	5.7	B3	19 47 .5	+40 22	−54		+86

The spectrum of Lal. 18397 is composite.

W. S. ADAMS.

PHOTOGRAPHIC ALBUM OF THE ECLIPTIC ZONE.

Under the auspices of the Astronomical Society of Spain and America, J. COMAS SOLÁ, Director of the Fabra Observatory, Barcelona, Spain, has undertaken to photograph the entire ecliptic region with a Petzval objective, 16^{cm} in diameter and 80^{cm} focal length. Forty photographic plates, 18×20^{cm}, covering an effective field of $10° \times 12°$, will take all the stars of the ecliptic zone down to the thirteenth magnitude. The reseau put on each plate will make the determination of coördinates easy and accurate. The stars are allowed to trail for a short time to show the east-west direction. Two exposures are given to each plate to make the difference between defects and photographic images clear. The separation of the two images is $30'' = 1/8$ of a millimeter on the photographic plate. Small planets may be dscovered or rediscovered in this way, since neither the separation of the images nor the direction of the trails will be the same as for the stars. The negatives will be